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CDFW Outline for Proposed Desert Kit Fox Health Monitoring and Mitigation Program

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What is the history of distemper in desert kit foxes and what is being monitored now?
Canine distemper virus (CDV) deaths were first detected in desert kit foxes inhabiting areas on and near the Genesis solar site in Oct 2011. This was the first report ever of distemper causing death in this species. Distemper deaths continued near the Genesis site through Dec 2011.

In Jan 2012 the CDFW Wildlife Investigations Laboratory initiated a monitoring effort to determine the extent of disease exposure, characterize the virus, and assess potential population impact. Additional distemper deaths were detected in Feb 2012 approximately 19 km south of the Genesis site near the Colorado River substation, and foxes shedding distemper virus were detected near both of these sites. Although not conclusive, trapping results suggested that reproduction was poor in the areas where distemper cases had occurred and that there were localized declines in the numbers of foxes.

To better detect cases, the survival of a sample ranging from 9-18 radio collared foxes living in close proximity to each site and their dens have been monitored via telemetry and remote cameras at four study sites since late January 2012. Consultants for the Desert Sunlight, Colorado substation, and Nextera Genesis are monitoring survival of the collared foxes near their respective sites while the Palen site is monitored by a CDFW wildlife technician.

To date 22 kit fox carcasses submitted from the solar projects have been necropsied and 11 of these deaths (50%) were due to distemper. The last known distemper death was detected in May 2012 near the Colorado River substation. No distemper caused mortalities have been detected in monitored foxes near the Palen or Desert Sunlight sites located in the western portion of the solar zone. That said, testing of live foxes in 2012 and 2013 shows that some foxes in this area have been exposed to canine distemper virus (they have antibodies in their serum against the virus). Thus it is likely that canine distemper virus is also present in the western portion of the solar zone.

It is important to note that only 14 foxes are currently radio-collared. These individuals act as sentinels allowing us to detect deaths. In addition to collared foxes, we rely on project biologists and staff to report sick or dead foxes. It is always possible that foxes sick or dead foxes are not detected. Our ability to detect cases is also impeded by the fact that carcasses decompose or are scavenged very quickly after death.

What is the rationale for initiation of a CDFW led Monitoring & Mitigation Program?

- Once established in a population, canine distemper virus (CDV) can cause repeated (cyclical) outbreaks. The time when this is most likely to happen is when susceptible young of the year are growing up and dispersing because density is high and animals are moving, therefore there is more opportunity to transmit the virus and more naïve animals present on the landscape to be infected. This time of year also corresponds to the time when projects are permitted to passively relocate foxes whose dens are within the project construction area.
- Passive relocation or hazing activities conducted in an area experiencing or adjacent to distemper cases may enhance disease transmission and spread by multiple mechanisms.
    - First, animals stressed by disturbance or relocation may be more susceptible to illness and death because CDV infection decreases immune function (ref).
    - Second, passive relocation activities in an area experiencing clinical CDV cases may result in increased movement of animals shedding virus, thereby increasing the number of new cases or enhancing the spread of disease into new areas.
- Current regulations prohibit "take" in any form by entities other than CDFW or its direct agents.
- Little to nothing is known about the potential impacts of passive relocation on foxes from solar sites nor have alternative techniques been explored to determine best practices. Important unanswered questions include:
    - Do passively relocated animals re-establish territories adjacent to the solar site? Or might this depend on the density or spatial distribution of foxes around a site.
    - Do relocated foxes experience lower survival or different causes of mortality that might need to be addressed through mitigation efforts.
    - Recursion rate – how likely are relocated foxes going to try to get back on site and return to former den areas?
    - Demographic shifts of neighbors
    - Reproductive impact (n=1 relocated pair this year had den failure; most other dens were successful this year in producing pups).
    - Rapid vs slow relocation etc.
    - Utilization of artificial dens
    - Longer term translocation decisions
    - Current monitoring limited in scope and inadequate to address needs (underfunded).
    - Methods and outcomes for relocation are not evaluated systematically or reported.

CONNECTING THE DOTS:

What do we think the impact of these projects is?

- Eviction and displacement of kit foxes from land slated for development may increase the risk for clinical canine distemper cases (usually resulting in death) of kit foxes and may spread the disease to other foxes that otherwise would not have been exposed to the virus.
- As more projects are approved and constructed there is potential for additional larger scale cumulative population health impacts that are not yet completely recognized.

How will this program help mitigate those impacts? (Program Goals)

- By minimizing the number of clinical cases (and therefore deaths) to the greatest extent possible and reducing the risk of disease spread through trapping and testing, radio collaring, monitoring, and selective vaccination of animals targeted for relocation.
- By utilizing best practices during relocation events to minimize stress to the greatest extent possible and by systematically evaluating relocation outcomes to determine factors associated with successful vs. unsuccessful outcomes.
- By providing treatment and rehabilitation for foxes found sick or injured due to construction site activities.
- By definitively determining the cause of death whenever possible for foxes that die or are found dead in the project impact area so that projects can address and potentially avoid any causes of death that are construction related.